# 201-12977

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Subject: Aluminum Alkyls Category Justification

ORIGINAL



To: oppt.ncic@epa.gov; hpv.crtk@epa.gov; chem.rtk@epa.gov

Subject: Aluminum Alkyls Category Justification

Date: March 20, 2001

Consistent with the original commitment made to EPA by the Aluminum Alkyls Consortium in a letter to Carol Browner dated November 30, 1999, attached in Word format is the category rationale/test plan for the Aluminum Alkyls category, which consists of the following chemicals for the HPV Challenge Program:

| | Chemical Name | CAS Number |
|---|---|---|
| | Aluminum triethyl | 97-93-8 |
| | Aluminum chlorodiethyl | 96-10-6 |
| | Aluminum tri isobuty. | 100-99-2 |
| | Aluminum dichloroethyl | 563-43-9 |
| | Aluminum tri n-octyl | 1070-00-4 |
| | Aluminum tributyl | 1116-70-7 |
| | Aluminum trihexyl | 1116-73-0 |
| | Aluminum tri (C2-C20) alkyls | 68908-97-4 |
| | Aluminum trichloro triethyldi | 12075-68-2 |
| | Aluminum diisobutyl chloride | 1779-25-5 |
| | | |
| Aluminum tridodecyl * | 1529-59-5 | |
| Aluminum trihexadecyl * | 1726-65-4 | |
| Aluminum tris (decyl) * | 1726-66-5 | |
| Aluminum trioctadecyl * | 3041-23-4 | |
| Aluminum tridocosyl * | 6651-25-8 | |
| Aluminum tritetracosyl * | 6651-26-9 | |
| Aluminum trioctacosyl * | 6651-27-0 | |
| Aluminum trihexacosyl * | 10449-71-5 | |

| | | |
|---|---|---|
| Aluminum triethyl * | 97-93-8 | |
| Aluminum tributyl * | 1116-70-7 | |
| Aluminum trihexyl * | 1116-73-0 | |
| Aluminum trioctyl * | 1070-00-4 | |
| Aluminum trieicosyl * | 1529-57-3 | |
| Aluminum tritetradecyl * | 1529-58-4 | |
| | | |

Components of tri (C2-C20) alkyls, not all have physical/chemical data

This file is submitted for Log# (internal Agency Tracking Number)201-1196, Aluminum Alkyls Consortium (AAC). The AAC consists of AkzoNobel - Polymer Chemicals Metal Alkyls; Albemarle Corporation; BP Amoco; CONDEA Vista Company; Chattem Chemicals, Inc.; Crompton Corporation; Rhodia Inc.

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 - aluminum.doc

# CATEGORIZATION
# OF
# ALUMINUM ALKYLS

**Submitted by:**
THE ALUMINUM ALKYLS CONSORTIUM

**Prepared by:**
HEALTH & ENVIRONMENTAL HORIZONS, LTD.

**March 20, 2001**
**Revised August 23, 2001**

**High Production Volume Chemicals**
**Aluminum Alkyls**

The Aluminum Alkyls Consortium (AAC) is a group of manufacturers committed to assuring the human and environmental safety of their chemicals. As such a consortium, the AAC has agreed to participate in the US EPA High Production Volume (HPV) Chemicals Challenge Program by sponsoring a group of HPV chemicals and mixtures for study. These chemicals are:

| Chemical Name | CAS Number |
|---|---|
| aluminum triethyl | 97-93-8 |
| aluminum chlorodiethyl | 96-10-6 |
| aluminum tri isobutyl | 100-99-2 |
| aluminum dichloroethyl | 563-43-9 |
| aluminum tri n-octyl | 1070-00-4 |
| aluminum tributyl | 1116-70-7 |
| aluminum trihexyl | 1116-73-0 |
| aluminum tri (C2-C20) alkyls | 68908-97-4 |
| aluminum trichloro triethyldi | 12075-68-2 |
| aluminum diisobutyl chloride | 1779-25-5 |
| aluminum tridodecyl * | 1529-59-5 |
| aluminum trihexadecyl * | 1726-65-4 |
| aluminum tris (decyl) * | 1726-66-5 |
| aluminum trioctadecyl * | 3041-23-4 |
| aluminum tridocosyl * | 6651-25-8 |
| aluminum tritetracosyl * | 6651-26-9 |
| aluminum trioctacosyl * | 6651-27-0 |
| aluminum trihexacosyl * | 10449-71-5 |
| aluminum triethyl * | 97-93-8 |
| aluminum tributyl * | 1116-70-7 |
| aluminum trihexyl * | 1116-73-0 |
| aluminum trioctyl * | 1070-00-4 |
| aluminum trieicosyl * | 1529-57-3 |
| aluminum tritetradecyl * | 1529-58-4 |

* Components of tri (C2-C20) alkyls, not all have physical/chemical data

AAC believes that these chemicals appropriately belong in a single study group-based category based on the highly reactive nature of the aluminum alkyls i.e., their immediate reaction with both air and water resulting in breakdown of the compounds. Indeed, it does not appear to be meaningful, feasible or safe to perform mammalian or ecotoxicological tests on such a reactive group.

Aluminum alkyls are highly reactive materials that are used in a variety of industrial chemical processes such as polymerization, oligomerization, alkylation, and stereochemical synthesis. They are compatible and miscible in

all proportions with saturated aliphatic and aromatic hydrocarbons such as pentane, hexane, heptane and toluene. They combine rapidly with compounds containing oxygen and are extremely hazardous during such combinations (Wissink, 1997). These reactions may result in ether cleavage accompanied by gas evolution (Mole and Jeffery, 1972).

In a final rule, OSHA established an 8-hour TWA limit of 2 $mg/m^3$ for both the soluble salts of aluminum and the aluminum alkyls. The agency concluded that these limits will protect against the significant risk of irritation and skin burns which constitute material health impairments that are associated with exposures at levels above the PEL (OSHA, 1988). Although toxicity data are sparse for the aluminum alkyls, it is known that all of the nonhalogenated alkyls may decompose into aluminum oxide fume, and the halogenated alkyls are even more irritating because of acid hydrolysis (ACGIH, 1991).

**Structures and Properties**

Structures of the aluminum alkyls and the chloroaluminum alkyls discussed in this document are presented in Table 1. These structures are strikingly similar for the alkyl moieties, differing only in length of the alkyl group. The chlorinated compounds are also very similar in structure except for a halide displacement of an alkyl.

Most of the chemistry of organoaluminum compounds can be readily explained in terms of the Lewis acidity of organoaluminum monomers, directly related to the tendency of the aluminum atom to build up an octet of electrons. Reactions of these substances are explosive, particularly for those without halide components. Halogenated compounds may exhibit the same reactivity but at a slower rate (Mole and Jeffrey, 1972). Their Lewis acidity results in self-association of organoaluminum compounds. Halides arise from association of the Lewis acidic aluminum center with a lone pair of electrons from the electronegative atom. The trialkyl aluminums are highly reactive towards oxidizing agents including molecular oxygen, thus, the fast reactions in air. This high reactivity extends to the less strongly associated derivatives such as the dialkylaluminum halides.

**Reactivity**

Pyrolyis occurs frequently by non-radical mechanisms (Tajima and Marsel). The volatile products of triethylaluminum, for example were found to be ethene, ethane, 1-butene, cis and trans-2-butene, hydrogen and lesser amounts of methane, butane and hexenes (Smith and Wartik). Breakdown products are expected to be long or short chain alkyls or the oxidized components of these. Shorter chain compounds are more reactive species based on the flash points (Table 2); however, all compounds in the group are strongly reactive.

**Potential Risks Because of Reactivity**

<u>Reactions with Oxygen (air)</u>

$R_3Al + O_2 \rightarrow Al_2O_3 + H_2O + CO_2$

$R_2AlCl + O_2 \rightarrow Al_2O_3 + H_2O + CO_2 + HCl + heat$

The above reactions are vigorous and will generally cause the material to ignite resulting in a fire that is difficult to extinguish. Often, the recommended fire fighting practice is simply to let the material burn itself to extinction.

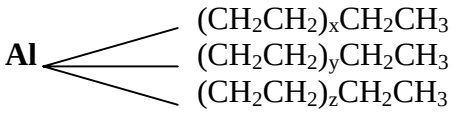
Reactions with Water

$R_3Al + H_2O \rightarrow Al(OH)_3 + RH + heat$
$R_2AlH + H_2O \rightarrow Al(OH)_3 + H_2 + heat$
$R_2AlCl + H_2O \rightarrow Al(OH)_3 + RH + HCl + heat$

The above reactions are even more violent than those with oxygen. The reaction with water creates flammable gases that are easily ignited by the fire already created by the organoaluminum compound with water. For this reason, water is generally not recommended for use in fighting aluminum alkyl fires. It can be concluded that exposure of aluminum alkyls to test animals would be cruel and not generate meaningful data. In fact, the use of any test method where water is not excluded is of no value.

**Hazard Characterization**
Because of the strong reactivity of the aluminum alkyls, these compounds are expected to cause thermal burns to eye and skin and inhalation may cause metal fume fever (Occupational Medicine, 1993). These chemicals are required to be labeled as spontaneously combustible, water reactive and flammable.

**C2 - C20 Complexes**
This group of sponsored materials includes the mixture, Aluminum, tri C2 -C20 alkyl complexes (CAS No. 68908-97-4) as well as the compounds in this mixture as shown in Table 3. The separate compounds are included because of the way these materials are designated for USEPA Toxic Substances Control Act (TSCA) purposes, however only the mixture is actually produced commercially. This mixture is composed of the species described by the structure shown below:




where x, y and z are integers from 0 - 16 corresponding to a Poisson distribution. This mixture is mostly composed of the C6 - C14 alkyls. It is never isolated into its individual components and is used on-site by chemical companies but not sold. Thus, we have considered the mixture, for classification purposes, as a single entity.

**Conclusion**
Table 1 demonstrates the similar structures of the aluminum alkyls. Table 2 provides information on the similarity of physical chemical properties. Although the sizes of the molecules are distinctly different from each other, their unique reactivity with both water and air shows reactions that preclude testing of these compounds. For example, because of the reactive properties, such compounds cannot be mixed in ordinary diets or administered in water. They are so reactive there is no possibility of administering repeated doses to animals because the acute hazards will prevent study of meaningful sub-chronic effects; the effect on tissues from single exposures obviates meaningful testing from repeated insults. Decomposition, which occurs almost spontaneously in air or water, precludes testing a moiety that resembles the parent material. In addition, decomposition products are substantially different enough from the parent materials to disallow any meaningful association with the parent chemical. Some decomposition products are shown in the reactivity section and exhibit corrosive effects as well as explosive potential.

Information from OSHA and ACGIH suggests that there are substantial hazards presented to technicians in the laboratory that would preclude testing these materials in a manner safe to humans. Finally, acute hazards to these materials (e.g. thermal burns to the eyes, skin, respiratory tract, and gastrointestinal tract) are such as to prevent testing them humanely, and without substantial pain and suffering to the species exposed.

The inclusion of these aluminum alkyls in the same category is based on the very similar structures shown in Table 1. However, the most compelling evidence of likely similar mechanisms of action is demonstrated in Table 2. Some of the characteristics of these alkyls are compared in Tables 2a and 2b. In appearance, all are colorless liquids except the dichloride compound (a solid) and the aluminum trialkyls (C2-C20), which are milky in color. All react violently with both water and air. Vapor pressures, although they cannot be directly compared, would all be expected to be below one mm Hg at 25$^{o}$C. Flash points are all very low. Comparable properties are shown in Tables 2a and 2b.

**References**

Mole J. and Jeffery, E.A., "Organoaluminum Compounds", Elsevier Publishing Company. Amsterdam 1972.
Wissink, H.G., *Aluminum alkyl reactivity.* Chemical & Engineering News. 1997. **75**, 9.

Occupational Safety and Health Administration, OSHA. 1988. Final Rule on Air Contaminants Project. 54FR2324 et seq.

Albemarle. August, 2000. Product Stewardship Manual. Aluminum Alkyls.

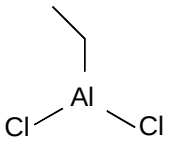
Tajima and Marsel as cited in Mole and Jeffery, 1972.

Smith and Wartik as cited in Mole and Jeffery, 1972.

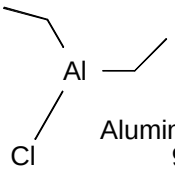
ACGIH. Documentation of TLVs. 1991.

Occupational Medicine: State of the Arts Reviews, **8.** No. 3, 1993.

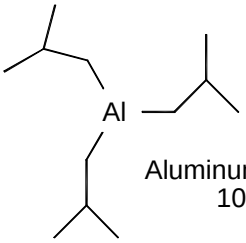
# TABLE 1



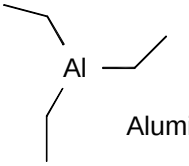

Aluminum dichloroethyl
563-43-9



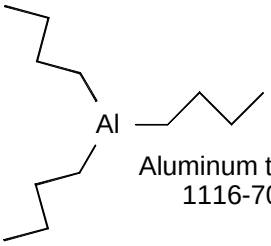

Aluminum chlorodiethyl
96-10-6



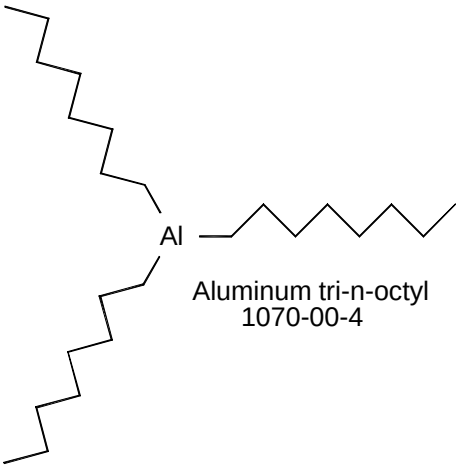

Aluminum tri isobutyl
100-99-2



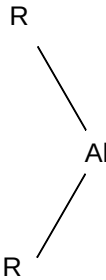

Aluminum triethyl
97-93-8




Aluminum tributyl
1116-70-7

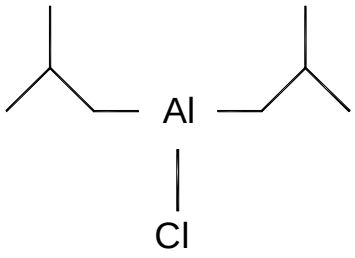



Aluminum tri-n-octyl
1070-00-4

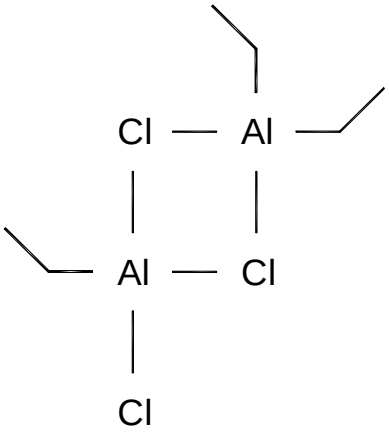



Aluminum tri C2-C20 alkyl complexes
68908-97-4

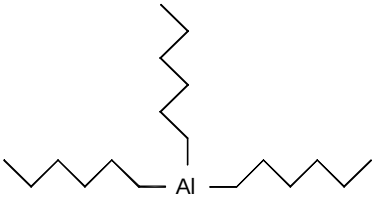
where R = C2 - 20



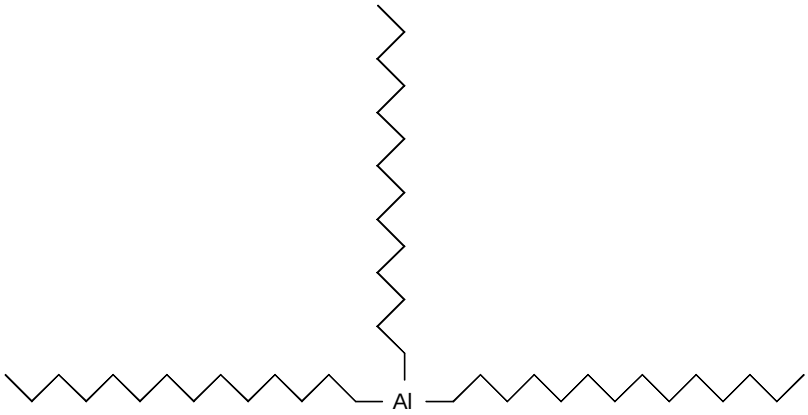

Aluminum chlorobis (2-methylpropyl)
1779-25-5



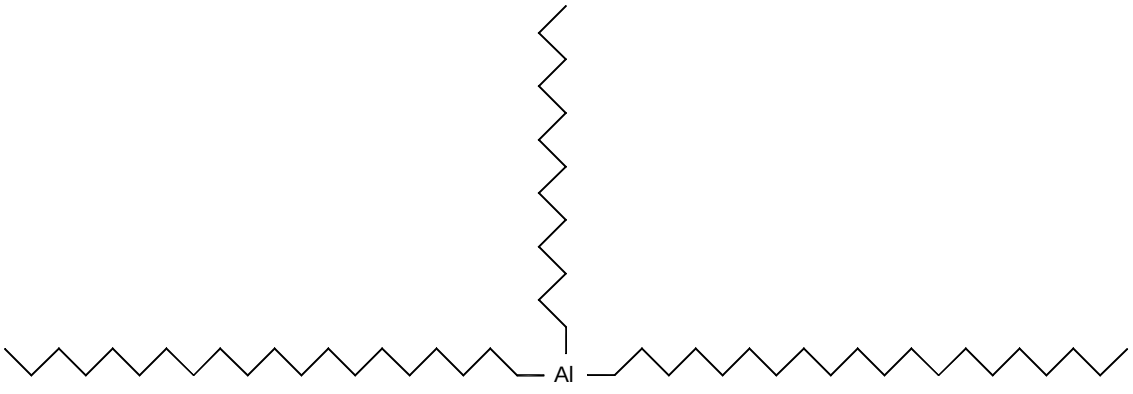

Aluminum, di-m-chlorochlorotriethyldi-
12075-68-2



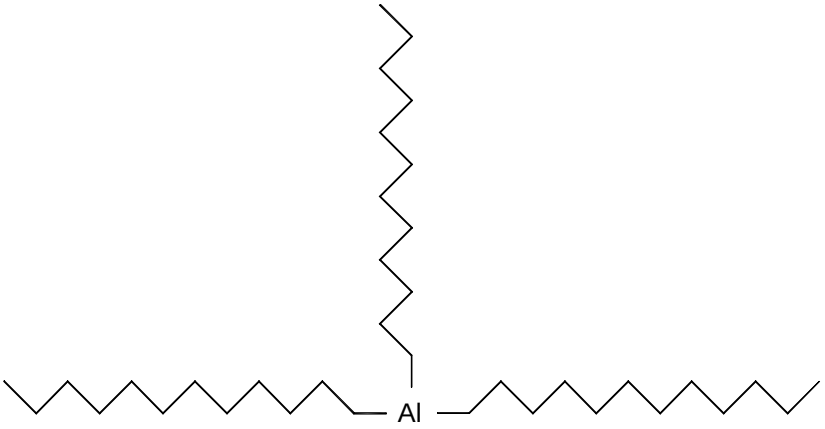

Aluminum trihexyl
1116-73-0



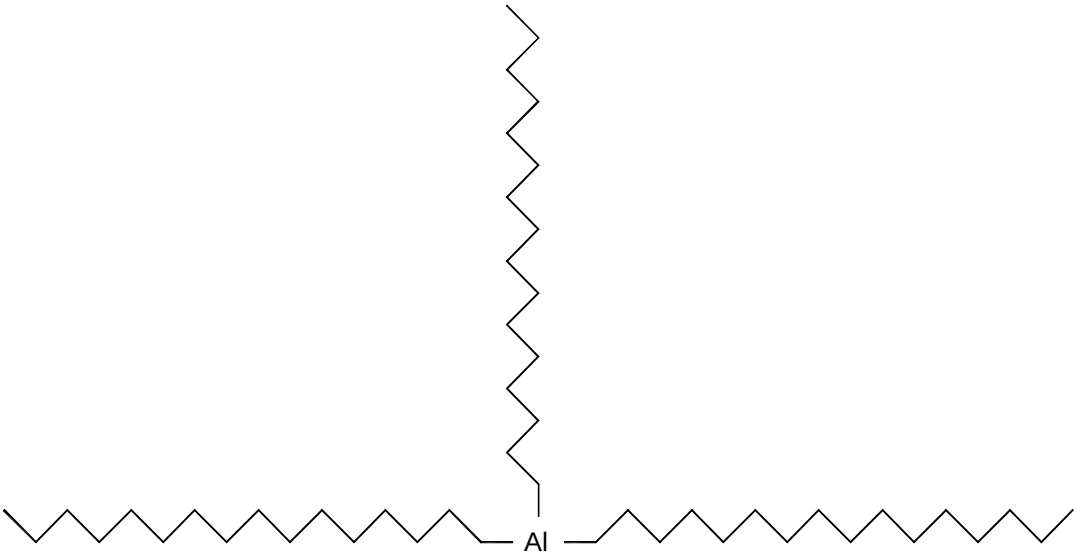

Aluminum tritetradecyl
1529-58-4




Aluminum trieicosyl
1529-57-3




Aluminum tridodecyl
1529-59-5




Aluminum trihexadecyl
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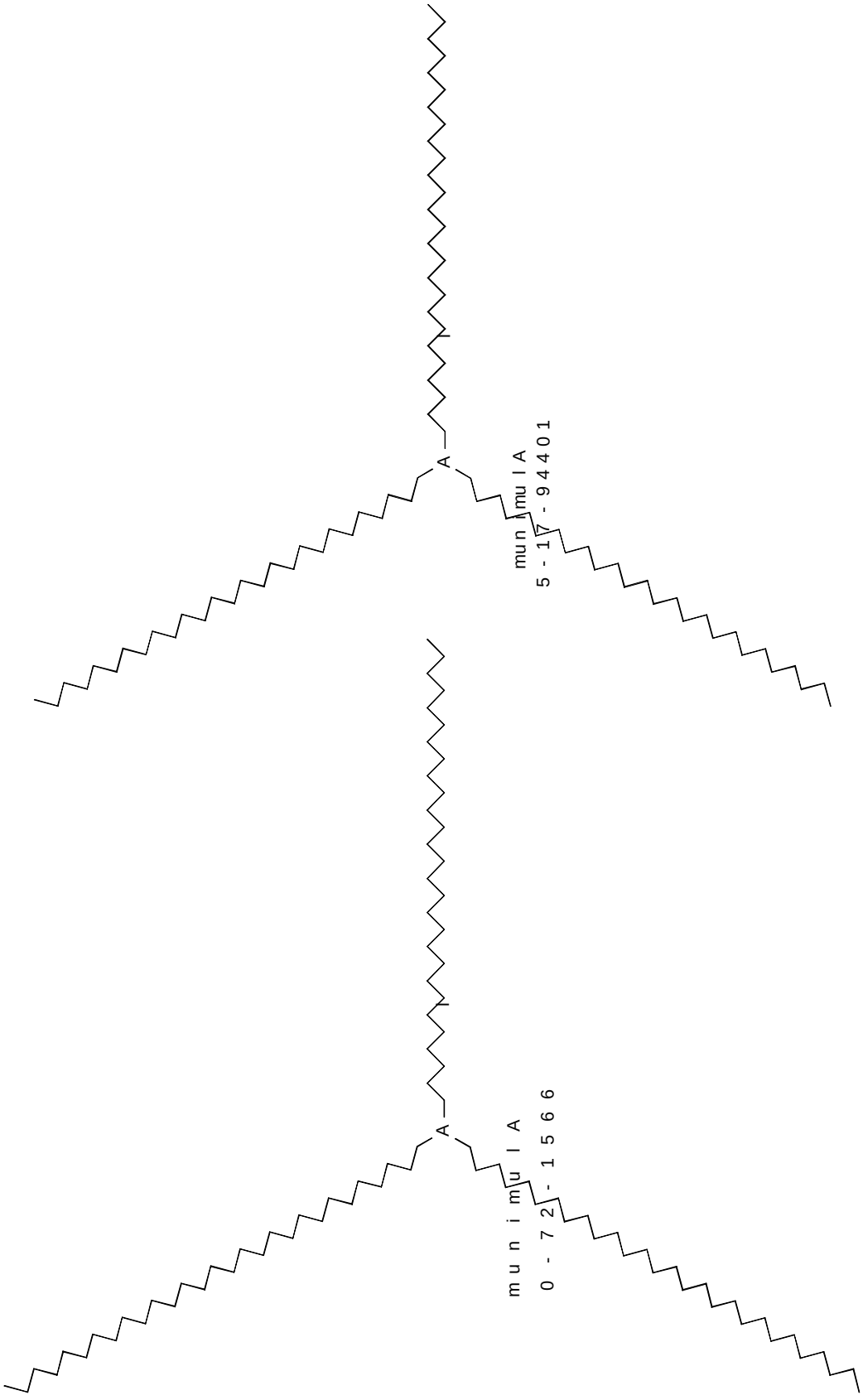
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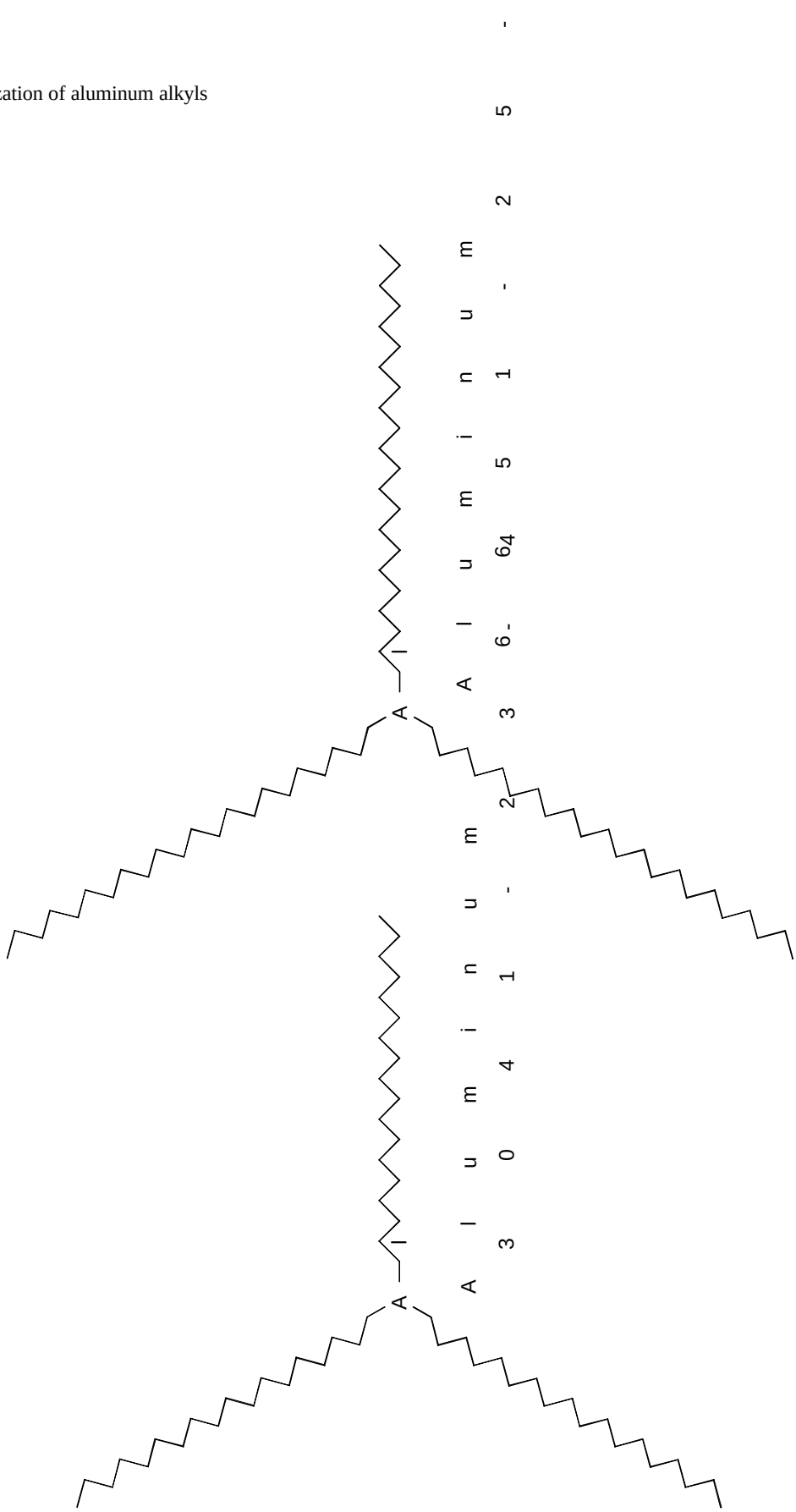
munimulA
0-72-1566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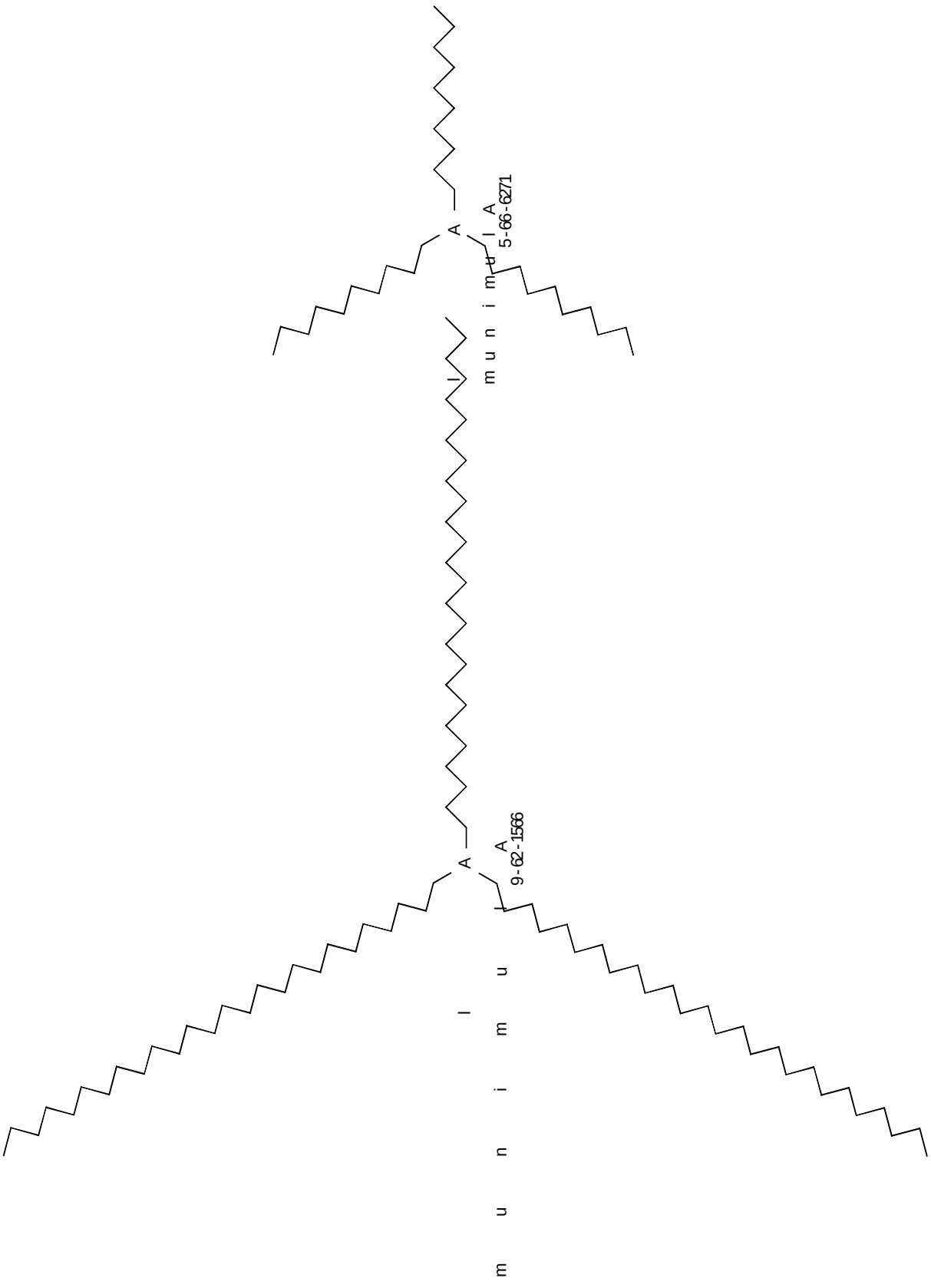
Aluminum
Aluminum
Aluminum
A
A
A
9-62-1566
5-66-6271

**Table 2**
**Physical/Chemical Properties**
**Aluminum Alkyls**

**Values are for materials as sold or shipped**

| Chemical | CAS | Molecular Formula | Molecular Weight | Melting Point °C | Boiling Point °C @ mm Hg* | Density g/ml/ °C | Vapor Pressure mm Hg/°C | Flash Point °C | Appearance | Solubility |
|---|---|---|---|---|---|---|---|---|---|---|
| aluminum triethyl | 97-93-8 | $(C_2H_5)_3Al$ | 114.2 | -52 (e) | 185@760 (b) | 0.83 @25 (b, e) | 0.025/25 (b) | ignites spontaneously | colorless liquid | violent reaction w/water |
| aluminum chlorodiethyl | 96-10-6 | $(C_2H_5)_2AlCl$ | 120.6 | -85 (e) | 214@760 (b) | 0.96@25 (b, e) | 0.17/25 (b) | -23 (b) | colorless liquid | violent reaction w/water |
| aluminum tri isobutyl | 100-99-2 | $(iC_4H_9)_3Al$ | 198.3 | 6 (f) | 214@760 (b) | 0.78@25 (b) | 0.133/251/47 (b, f) | -23 (b) | colorless liquid | violent reaction w/water |
| aluminum dichloroethyl | 563-43-9 | $C_2H_5AlCl_2$ | 126.9 | 32 (b) | 203@760 (b) | 1.2@25 (b) | 10/80 (b) | ignites spontaneously | white crystalline solid | violent reaction w/water |
| aluminum tri n-octyl 7% solvent | 1070-00-4 | $(nC_8H_{17})_3Al$ | 366.7 | ND | 361@760 (b) | 0.83@25 (b) | $10^{-7}$/40 (b) | ignites spontaneously | colorless liquid | violent reaction w/water |
| aluminum tributyl | 1116-70-7 | $(nC_4H_9)_3Al$ | 198.3 | ND | 240@760 (b) | 0.82@25 (b) | <0.75/80 (b) | ignites spontaneously | colorless liquid | violent reaction w/water |
| aluminum trihexyl | 1116-73-0 | $(nC_6H_{13})_3Al$ | 282.5 | -60 -77 (b, e) | ND | 0.65@25 0.8@30 (b, e) | <0.75/80 (f) | ignites spontaneously | colorless liquid | violent reaction w/water |
| aluminum tri $C_2$-$C_{20}$ alkyls | 68908-97-4 | ND | ND | ND | ND | ND | ND | ND | milky colored liquid | violent reaction w/water |

(a) Mole and Jeffery 1972
(b) Albemarle (2000)
(d) CONDEA
(e) AKZO Nobel(c) Amoco (2000)
(f) Crompton (formerly Witco)

**Table 2 Cont.**

**Values are for materials as sold or shipped**

| Chemical | CAS | Molecular Formula | Molecular Weight | Melting Point °C | Boiling Point °C/ mm Hg | Density g/ml/ °C | Vapor Pressure mm Hg/°C | Flash Point °C | Appearance | Solubility |
|---|---|---|---|---|---|---|---|---|---|---|
| aluminum trichloro triethyldi | 12075-68-2 | $(C_2H_5)_3Al_2Cl_3$ | 248 | Decomposes before measurement (f) | | | 8.27/80 (f) | Ignites spontaneously | liquid | violent reaction with water |
| Aluminum diisobutyl chloride | 1779-25-5 | $(C_4H_9)_2AlCl$ | 176 | Decomposes before measurement (f) | | | 0.22/80 (f) | Ignites spontaneously | liquid | violent reaction with water |

(a) Mole and Jeffery 1972
(b) Albemarle (2000)
(c) Amoco (2000)
(d) CONDEA
(e) AKZO Nobel
(f) Crompton (formerly Witco)

**Table 2a**
**Comparison of Physical Appearance**
**and**
**Reactions with Water**

| Chemical | CAS | Appearance | Solubility |
|---|---|---|---|
| aluminum triethyl | 97-93-8 | Colorless liquid | Violent reaction w/water |
| aluminum chlorodiethyl | 96-10-6 | Colorless liquid | Violent reaction w/water |
| aluminum tri isobutyl | 100-99-2 | Colorless liquid | Violent reaction w/water |
| aluminum dichloroethyl | 563-43-9 | White crystalline solid | Violent reaction w/water |
| aluminum tri n-octyl 7% solvent | 1070-00-4 | Colorless liquid | Violent reaction w/water |
| aluminum tributyl | 1116-70-7 | Colorless liquid | Violent reaction w/water |
| aluminum trihexyl | 1116-73-0 | Colorless liquid | Violent reaction w/water |
| aluminum trichloro triethyldi | 12075-68-2 | Liquid | Violent reaction w/water |
| aluminum diisobutyl chloride | 1779-25-5 | Liquid | Violent reaction w/water |
| aluminum tri C2-C20 alkyls | 68908-97-4 | Milky colored liquid | Violent reaction w/water |

**Table 2b**
**Comparison of Flash Points for Aluminum Alkyls**

| Chemical | CAS | Flash Point $^{o}$C |
|---|---|---|
| | | |
| Aluminum triethyl | 97-93-8 | Ignites spontaneously |
| Aluminum chlorodiethyl | 96-10-6 | -23 |
| Aluminum tri isobutyl | 100-99-2 | -23 |
| Aluminum dichloroethyl | 563-43-9 | Ignites spontaneously |
| Aluminum tri n-octyl 7% solvent | 1070-00-4 | Ignites spontaneously |
| Aluminum tributyl | 1116-70-7 | Ignites spontaneously |
| Aluminum trihexyl | 1116-73-0 | Ignites spontaneously |
| Aluminum trichloro triethyldi | 12075-68-2 | Ignites spontaneously |
| Aluminum diisobutyl chloride | 1779-25-5 | Ignites spontaneously |
| Aluminum tri $C_2$-$C_{20}$ alkyls | 68908-97-4 | <38 |

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Tris (2-methylpropyl)aluminum (CAS No. 100-99-2)

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** Unknown
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 86 °C
- **Pressure:** 10
- **Pressure unit:** mm Hg
- **Decomposition (yes/no/ambiguous):** Unknown

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Windholz, M. 1982. The Merck Index, 9th Edition. Merck and Company, Inc., Rahway, NJ

Cited Documents:

## OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, chlorodiethyl
CAS# 96-10-6

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C):** 0.96 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, chlorodiethyl
- CAS: 96-10-6

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 214
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# FLASH POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, chlorodiethyl
- CAS#: 96-10-6

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** ASTM D93 Standard Test Methods for Flash-Point by Pensky-Martens Closed Cup Tester
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Flash Point value (°C):** -23
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Study conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

- 

## OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, chlorodiethyl
- CAS# 96-10-6
- 

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** 0.17 mm Hg
- **Temperature (°C):** 25
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

- 

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

## BOILING POINT

### TEST SUBSTANCE

- **Identity:** Aluminum, dichloroethyl
- CAS: 563-43-9

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

### RESULTS

- **Boiling point value (°C):** 203
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, dichloroethyl
CAS# 563-43-9

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C):** 1.2 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# Melting Point

## Test Substance

**Identity:** Aluminum, dichloroethyl

CAS: 563-43-9

***Remarks Field for Test Substance***

## Method

**Method/guideline followed: Unknown**

**GLP (Y/N): Unknown**

**Year (study performed):** Unknown

***Remarks Field for Test Conditions***

## Results

**Melting point value (°C): 32**

**Decomposition (yes/no/ambiguous):**

**Sublimation (yes/no/ambiguous):**

***Remarks Field for Results***

## Conclusions

***Remarks Field with Ability to Identify Source of Comment***

## Data Quality

**Reliabilities (Klimisch Code):**

***Remarks Field for Data Reliability***

## References

**Key Study:** Original work done by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Last changed (administrative field for updating):**

**Order number for sorting (administrative field):**

***Remarks Field for General Remarks***
**Supporting Data:**

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, dichloroethyl
- CAS# 563-43-9
- 

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** 10 mm Hg
- **Temperature (°C):** 80
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

- 

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# Density

## Test Substance

**Identity:** Diethylaluminum chloride CAS# 96-10-6

## Method

**Method/guideline followed:** ICS-115 The density of a metal alkyl is necessary when calculating weights of additions to a process where the additions were made in volume increments. The density of a metal alkyl is measured using a calibrated pycnometer into which a weighed amount of alkyl is added. The pycnometer is then placed in a constant temperature bath and the volume of the weighed sample is determined. The density of the alkyl is temperature dependent and is reported as a value at a specific temperature.

**GLP (Y/N):** N

**Year (study performed):**

## Results

**Density value (°C):** 0.961 g/mL @25C

## Conclusions

Density for triethyl aluminum is 0.961 g/mL @25C.

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

# Melting Point

## Test Substance

**Identity:** Diethylaluminum chloride  CAS#  96-10-6

## Method

**Method/guideline followed:** ICS-115  Approximately fifteen milliliters of alkyl is transferred into a glass apparatus and placed within an acetone/dry ice bath. As the mixture is agitated, the alkyl solution is allowed to super-cool. The data points collected are recorded onto a diskette using MS DOS Ertco-Hart. The file is converted into an Excel graph to determine the exact freezing point.

**GLP (Y/N):** N

**Year (study performed):**

## Results

**Melting point value (°C):** -85C

## Conclusions

Melting point for diethylaluminum chloride is –85C**.**

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

# MELTING POINT

## TEST SUBSTANCE

- **Identity:** Trichlorotriethyldialuminum (CAS No. 12075-68-2)

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** Unknown
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Melting point value (°C):** Not relevant
- **Decomposition (yes/no/ambiquous):** yes (ca 150 °C)
- **Sublimation (yes/no/ambiguous):** Unknown

**Remarks field for Results**

**CONCLUSIONS** Determination of melting point data not relevant as the item decomposes before a measurement can be made.

**Remarks field with Ability to Identify Source of Comment**

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Witco Material Safety Data Sheet. MSDS No. 700000001132. Rev. 1.3, 02/03/2001

Cited Documents:

## OTHER

- Last changed (administrative field for updating)

- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

## MELTING POINT

### TEST SUBSTANCE

- **Identity:** Chlorobis(2-methylpropyl)aluminum (CAS No. 1779-25-5)

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** Unknown
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

### RESULTS

- **Melting point value (°C):** Not relevant
- **Decomposition (yes/no/ambiquous):** yes (ca 150 °C)
- **Sublimation (yes/no/ambiguous):** Unknown

**Remarks field for Results**

**CONCLUSIONS** Determination of melting point data not relevant as the item decomposes before a measurement can be made.

**Remarks field with Ability to Identify Source of Comment**

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Witco Material Safety Data Sheet. MSDS No. 700000001237. Rev. 1.4, 06/20/2000

Cited Documents:

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, triethyl
- CAS: 97-93-8

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 185
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, triethyl
CAS# 97-93-8

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C):** 0.83 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, triethyl
- CAS# 97-93-8
-

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** 0.0253 mm Hg/ 913 mm Hg
- **Temperature (°C):** 25/ 190
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

-

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, tri hexyl
CAS# 1116-73-0

**Note on Test Substance**:

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C)**: 0.65 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, tri butyl
- CAS: 1116-70-7

**Remarks field for Test Substance:**

## METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 240
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, tri butyl
CAS# 1116-70-7

**Note on Test Substance**:

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C)**: 0.82 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# Density

## Test Substance

**Identity:** Triethyl aluminum CAS# 97-93-8

## Method

**Method/guideline followed:** ICS-115 The density of a metal alkyl is necessary when calculating weights of additions to a process where the additions were made in volume increments. The density of a metal alkyl is measured using a calibrated pycnometer into which a weighed amount of alkyl is added. The pycnometer is then placed in a constant temperature bath and the volume of the weighed sample is determined. The density of the alkyl is temperature dependent and is reported as a value at a specific temperature.

**GLP (Y/N):** N

**Year (study performed):**

## Results

**Density value (°C):** 0.835 g/mL @25C

## Conclusions

Density for triethyl aluminum is 0.835 g/mL @25C.

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

# Melting Point

## Test Substance

**Identity:** Triethyl aluminum CAS# 97-93-8

## Method

**Method/guideline followed:** ICS-115 Approximately fifteen milliliters of alkyl is transferred into a glass apparatus and placed within an acetone/dry ice bath. As the mixture is agitated, the alkyl solution is allowed to super-cool. The data points collected are recorded onto a diskette using MS DOS Ertco-Hart. The file is converted into an Excel graph to determine the exact freezing point.

**GLP (Y/N):** N

**Year (study performed):**

## Results

**Melting point value (°C):** -52C

## Conclusions

Melting point for triethyl aluminum is –52C**.**

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

# Density

## Test Substance

**Identity:** Aluminum, tri hexyl
CAS# 1116-73-0

**Note on Test Substance**:

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C)**: 0.65 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# Melting Point

## Test Substance

**Identity:** Aluminum, trihexyl

CAS: 1116-73-0

***Remarks Field for Test Substance***

## Method

**Method/guideline followed: Unknown**

**GLP (Y/N): Unknown**

**Year (study performed):** Unknown

***Remarks Field for Test Conditions***

## Results

**Melting point value (°C): -60**
**Decomposition (yes/no/ambiguous):**

**Sublimation (yes/no/ambiguous):**

***Remarks Field for Results***

## Conclusions

***Remarks Field with Ability to Identify Source of Comment***

## Data Quality

**Reliabilities (Klimisch Code):**

***Remarks Field for Data Reliability***

## References

**Key Study:** Original work done by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Last changed (administrative field for updating):**

**Order number for sorting (administrative field):**

***Remarks Field for General Remarks***
**Supporting Data:**

# Density

## Test Substance

**Identity:** Trihexyl aluminum CAS# 116-73-0

## Method

**Method/guideline followed:** ICS-115 The density of a metal alkyl is necessary when calculating weights of additions to a process where the additions were made in volume increments. The density of a metal alkyl is measured using a calibrated pycnometer into which a weighed amount of alkyl is added. The pycnometer is then placed in a constant temperature bath and the volume of the weighed sample is determined. The density of the alkyl is temperature dependent and is reported as a value at a specific temperature.

**GLP (Y/N):** N

**Year (study performed):**

## Results

**Density value (°C):** 0.816 g/mL @30C

## Conclusions

Density for trihexyl aluminum is 0.816 g/mL @30C.

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

# Melting Point

## Test Substance

**Identity:** Trihexyl aluminum CAS# 1116-73-0

## Method

**Method/guideline followed:** ICS-115 Approximately fifteen milliliters of alkyl is transferred into a glass apparatus and placed within an acetone/dry ice bath. As the mixture is agitated, the alkyl solution is allowed to super-cool. The data points collected are recorded onto a diskette using MS DOS Ertco-Hart. The file is converted into an Excel graph to determine the exact freezing point.

**GLP (Y/N):** N

## Results

**Melting point value (°C):** -77C

## Conclusions

Melting point for triehexyl aluminum is –77C**.**

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:**

**Cited Documents:**

## Other

**Supporting Data:** Data found in Akzo Nobel Chemicals Inc. product bulletin (1995).

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, trihexyl
- CAS# 1116-73-0
-

**Remarks field for Test Substance:**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** < 0.75 mm Hg
- **Temperature (°C):** 80
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

-

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, triisobutyl
- CAS# 100-99-2
-

**Remarks field for Test Substance**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** 0.133 mm Hg
- **Temperature (°C):** 25
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

-

### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, triisobutyl
- CAS: 100-99-2

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 214
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, triisobutyl
CAS# 100-99-2

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C):** 0.78 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

# FLASH POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, triisobutyl
- CAS#: 100-99-2

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** ASTM D56 Standard Test Methods for Flash-Point by TAG Closed Tester
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Flash Point value (°C):** -23
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Study conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

- 

## OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# Density

## Test Substance

**Identity:** Aluminum, tri n-octyl
CAS# 1070-00-4

**Note on Test Substance**: 7% solution in solvent

## Method: ASTM D1217 Standard Method for Density and Relative Density (Specific Gravity) of Liquids by Bingham Pycnometer

**GLP (Y/N):** Unknown

**Year (study performed):** Unknown

## Results

**Density value (°C)**: 0.83 g/mL @25C

## Conclusions

## Data Quality

**Reliabilities (Klimisch Code):**

## References

**Key Study:** Study conducted by Ethyl Corporation

**Cited Documents: Albemarle Corporation Material Safety Data Sheet**

## Other

**Supporting Data:**

## VAPOUR PRESSURE

### TEST SUBSTANCE

- **Identity:** Aluminum, tri n-octyl
- CAS# 1070-00-4
-

**Remarks field for Test Substance: 7% solvent solution**

### METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions: Aluminum alkyl assumed to consist entirely of the equilibrium mixture of monomer and dimer.**

### RESULTS

- **Vapor Pressure value:** $10^{-7}$ mm Hg
- **Temperature (°C):** 40
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

### CONCLUSIONS

### DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

### REFERENCES

Key Study: Original Studies Conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet, 2000

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### OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# BOILING POINT

## TEST SUBSTANCE

- **Identity:** Aluminum, tri n-octyl
- CAS: 1070-00-4

**Remarks field for Test Substance: 7% solution in solvent**

## METHOD

- **Method/guideline followed:** ASTM E1719 Standard Test Method for Vapor Pressure of Liquids by Ebulliometry
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Boiling point value (°C):** 361
- **Pressure:** 760
- **Pressure unit:** mmHg
- **Decomposition (yes/no/ambiguous):**

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**
-

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Original Studies conducted by Ethyl Corporation

Cited Documents: Albemarle Corporation Material Safety Data Sheet

**OTHER**

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**
Supporting Data:

# VAPOUR PRESSURE

## TEST SUBSTANCE

- **Identity:** Trichlorotriethyldialuminum (CAS No. 12075-68-2)

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** Unknown
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Vapor Pressure value:** 11 hPa (8.27 mm Hg)
- **Temperature (°C):** 80
- **Decomposition (yes/no/ambiguous):** yes (ca 150 °C)

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Witco Material Safety Data Sheet. MSDS No. 700000001132. Rev. 1.3, 02/03/2001.

Cited Documents:

## OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data:

# VAPOUR PRESSURE

## TEST SUBSTANCE

**Identity:** Chlorobis(2-methylpropyl)aluminum (CAS No. 1779-25-5)

**Remarks field for Test Substance**

## METHOD

- **Method/guideline followed:** Unknown
- **GLP (Y/N):** Unknown
- **Year (study performed):** Unknown

**Remarks field for Test Conditions:**

## RESULTS

- **Vapor Pressure value:** 0.3 hPa
- **Temperature (°C):** 80
- **Decomposition (yes/no/ambiguous):** yes (ca 150 °C)

**Remarks field for Results**

## CONCLUSIONS

## DATA QUALITY

- **Reliabilities (Klimisch Code):**

**Remarks field for Data Reliability**

## REFERENCES

Key Study: Witco Material Safety Data Sheet. MSDS No. 700000001237. Rev. 1.4, 06/20/2000

Cited Documents:

## OTHER

- Last changed (administrative field for updating)
- Order number for sorting (administrative field)

**Remarks field for General Remarks (Use for any other comments necessary for clarification.)**

Supporting Data: